

CHAPTER 4

UTILITIES

4-1. General. Utilities must be provided as necessary to support recreation facilities and the needs of the public. Appropriate alignment and location is very important for aesthetics, costs, and management reasons. Accurate visitation data are extremely important in the design of all utility Systems. Design for new projects should be based on anticipated or projected visitation. Area renovation should be based on actual historical visitation figures. In the design of utility systems emphasis will be placed on the costs of installing, operating, and maintaining the systems. These systems must meet all Federal, State, and local criteria and standards for health and safety. Utilities such as power and telephone lines, water, gas, and sewer mains, which occupy or cross road right-of-way, should be considered in location and design of the road. Normally, all utility lines should be placed underground unless cost or special conditions make such an installation prohibitive. Underground utilities should be located outside the roadway to avoid any disturbance to traffic during utility maintenance activities. Underground alignments can be traced by the placement of metallic tape in the utility trench. Electric and telephone lines may be placed in a common trench. Water and sanitary lines should be placed in separate trenches from power and telephone lines.

4-2. Power. Where feasible, all electric power lines should be placed underground inside recreation areas. Lines between use areas and lines from site boundaries to use areas can be placed above ground only if they do not interfere with safety, maintenance, or aesthetics. Overhead lines should not be placed where they become a safety hazard to sailboats and are not to be placed over access roads to boat launchings ramps or parking lots. Overhead powerlines should be aligned behind forest cover out of view where feasible. Clearances are to be thoroughly checked in accordance with NFPA-70, ANSI C2 and ER 1110-2-4401.

a. Private power utilities serving the facility are to be contacted at the concept stage to assure power is available in the vicinity and that utility connection charges are included in cost estimates.

b. Electricity may be provided to campsites and fees charged in accordance with ER 1130-2-404. Electrical hookups at campsites should be placed on the drivers side, at the rear of the parking pad. Ground-fault circuit interrupters (GFCI) are to be installed in accordance with NFPA-70. The main switch is to be located above the flood control elevation.

c. Exterior Lighting. Vandal resistant exterior lighting is to be provided where appropriate for the safety and security of the visitor. Exterior lights should be controlled with photoelectric cells or timed switches.

d. Solar Powered Lighting. Where economically feasible, and for safety and security, solar panel powered lighting should be considered where utility power is not available or utility line installation is too expensive.

4-3. Telephone Service. Public pay telephone service should be provided where appropriate for visitor safety and security.

4-4. Water Supply Systems. Water systems serving recreation areas are similar in some respects to rural community systems. As a rule they are rather compact, have branching type distribution piping, and must respond to widely varying water use rates which may be affected by many variables including:

- State and/or local regulations
- Location
- Type of facilities provided
- Visitation
- Visitor use
- Seasonal requirements
- Day of the week
- Special events
- Irrigation requirements
- Weather conditions

a. Corps Guidance. Table 4-1 provides estimated use rates for determining water supply needs for facilities at various recreation areas.

b. Peak Water Use. Peak water use rates suitable for design purposes may be determined by consideration of particular facilities to be provided together with an estimate of the maximum expected visitation. Detailed guidance is provided in EM 1110-2-503.

c. Water Sources. Potable water will be used in all supply systems. Municipal water systems will be utilized whenever feasible. The second most desirable source for a recreation area is wells. In the event of competing sources other than municipal systems, the source chosen should be based on capitalized cost and not merely initial cost. If the system requires chlorination special attention must be made to ensure safe working conditions for employees (Use of hypochlorinators is the preferred method).

d. Water Storage. The quantity of water storage is dependent upon amount and reliability of water source and variation in use. Operating level of water storage and distribution line size should be such that a minimum pressure of 30 to 40 p.s.i. exists at each building requiring flush valves. The location of water storage tanks, hydropneumatic tank, standpipes, or elevated storage tanks should be such that they do not detract from the aesthetics of the area.

Table 4-1

WATER SUPPLY REQUIREMENTS

The following values should be used to determine water supply needs for the various types of areas. Accurate visitation projections are required.

DAY USE

Picnic--comfort station	5 gpcd*
Overlook--comfort station	4 gpcd
Boat Launching Ramp--comfort station	3 gpcd
Bathhouse	10 gpcd

OVERNIGHT

Camping--washhouse	25 gpcd
Camping--washhouse w/washing machine	30 gpcd
Camping--showerhouse	25 gpcd
Camping--comfort station	10 gpcd
Camping--non-waterborne toilets	3 gpcd
Groupcamp--washhouse	25 gpcd

SANITARY DUMP STATION

Campground	10 gal/hr/fixture
Boat	10 gal/hr/fixture

*gpcd=gallons per capita per day; based upon standard flush fixtures and standard showerheads. Where State design quantity standards are higher than the Government's, the State's quantities shall take precedence.

References- EM 1110-2-501.

- EM 1110-2-503.

- WES TR EL-85-1.

e. Campground Service. Health standards need to be strictly observed. A frost-free spigot is recommended in areas that will be used during cool weather periods to avoid freezing. Frost-free antisiphon equipment with adequate drainage should be selected which will not allow contamination from ground water near the surface to enter the water line. If a water supply system needs to be winterized, low point gravity flow drain lines and force air connections will be provided. Feeder lines to individual campsites should carry a maximum pressure of 40 p.s.i. pressure reducer. This reduction will provide adequate water pressure without damaging the water lines in recreation vehicles.

f. Fire Protection Requirements. EM 1110-2-503 provides criteria for determining fire flow requirements. Generally, structures addressed in this chapter shall be constructed in accordance with NFPA, the Uniform Building Code, or local building codes, whichever are the most stringent.

g. Hot Water Service. Water heaters in washhouses may be gas, either natural or liquid propane (LP), or solar powered if more cost effective than electricity.

4-5. Sewage and Wastewater Systems. Sanitary waste disposal and/or treatment is one of the most crucial aspects of park development. Adequate disposal and/or treatment of all waste is a necessity and park development and expansion cannot proceed without these facilities. All designs for sewage disposal or wastewater treatment systems shall be in compliance with all State and local requirements.

a. Sewage Disposal. The most desirable method is to tie into a municipal system where feasible. This should be done even if initial costs are somewhat higher than other disposal systems, as the system may prove economical on a capitalized cost basis. Where municipal waste treatment systems are not available, and on-site treatment and disposal are required, land treatment should be evaluated as an alternative to any positive discharge treatment system. A life cycle cost analysis should be used to evaluate disposal system costs. If sewage lagoons are used they should be fenced and out of sight. If this is not possible, a buffer of plant materials should be provided to screen the lagoon from the view of visitors. Care should be taken to locate all treatment systems down-wind from the recreation complex.

b. Vault, Pit, Sand Filter, and Waterless Composting Systems. If permitted by State and local health standards, these systems may be used if visitation is too low to justify connecting to a central system or it is impractical or not recommended to connect.

c. Specific Guidance. EM 1110-2-501 part 2 provides sewage quantities for use in the design of sewage and wastewater disposal systems. The design

and specification for sewage disposal systems is site specific. The selected system must be cost effective and meet all required state and local standards. Accurate visitation projections are required to determine sewage treatment needs.

4-6. Sanitary Dump Station. The sanitary dump station is necessary to provide for the dumping and cleaning of campers' sewage holding tanks in a designated area. The dump station should include washdown facilities. The dump station should be located above the flood pool or be water tight to prevent flotation caused by flooding; be visually screened from public view; and, if feasible, allow connection to the campground sanitary system. When this is not possible a storage vault will be provided at the site. One station should be provided for each 100 sites or fraction thereof. Where boats have holding tanks a marine sanitary pump-out station should be provided in the vicinity of marinas or boat launch areas as required for health and safety. These stations should be accessible to boats while they are in the water. The design should consider the ease and access of pumping out the holding tanks of such facilities. Potable drinking water hose bibbs should be provided in the vicinity of the dump station to allow fresh water supply for camper units.